



9/28/2004

Patent Application

Application #: 10/707,239

Group Art Unit # 3712

Filing Date: 11/30/2003

Examiner: Dmitry Suhol

Title: Teaching Cylinder Instrument

Amendment to Brief Description of Drawing

- 1) The brief description of drawing has been modified to include reference numbers that have been added to the drawing. Also included are the descriptions of what the reference number are referring to.

The amendments includes no new matter that was not disclosed in the original specifications.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Gerald Bauldick

A handwritten signature in cursive script that reads "Gerald Bauldick".

## Brief Description of Drawings

[0014] Fig. 1a is a plan view of the invention which includes a transparent hollow outer half-cylinder designated by reference number 1, and a solid inner half-cylinder designated by reference number 2 that can rotates around a common center designated by reference number 3 for both the inner and outer half-cylinders. Fig. 1b is a view of the hollow outer half-cylinder. Fig. 1c is a view of the solid inner-half cylinder.

[0015] Fig. 2 is a top view of the inner and outer half-cylinders of the invention.

[0016] Fig. 3a is a front and side view of an individual slice and Fig. 3b is a side view of an individual slice showing the equations for the volume, front surface area and the side surface area.

[0017] Fig. 4a is a front and side view of a slice and Fig. 4b is a side view of a slice with an angle of 30 degrees. Numerical values are given for each surface area, arc length, and volume for a radius of 3 and a length of 5 as examples.

[0018] Fig. 5a is a plan view of four a slices with an angles of 15, 30, 45 and 90 degrees. Fig. 5b is a view of a slice with an angle of 30 degrees. Fig. 5c is a view of a slice with an angle of 90 degrees. Fig. 5d is a view of a slice with an angle of 45 degrees. Numerical values are given for each surface area, arc length, and volume for a radius of 3 and a length of 5 as examples.

[0019] Fig. 6a is a plan view of the hollow outer half-cylinder designated by reference number 1 and a solid inner half-cylinder designated by reference number 2 and with four slices attached to make a full 360 degree inner cylinder. The four slices have angles of 30 degrees designated by reference number 4, 15 degrees designated by reference number 5, 45 degrees designated by reference number 6, and 90 degrees designated by reference number 7. Fig. 6b is a top view of the hollow outer half-cylinder and the solid inner half-cylinder and with four slices attached to make a full 360 degree inner cylinder. Fig. 6c is a plan view of the hollow outer half-cylinder and the solid inner half-cylinder and with the four slices pulled out to distinguish the four slices. Fig. 6d is a top view of the hollow outer half-cylinder and the solid inner half-cylinder and with the four slices pulled out to distinguish the four slices.

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Amendment to Detailed Description

- 1) The detailed description has been modified to include reference numbers that have been added to the drawing. Also included are the descriptions of what the reference number are referring to.

The amendments includes no new matter that was not disclosed in the original specifications.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Gerald Bauldock

A handwritten signature in black ink that reads "Gerald Bauldock". The signature is fluid and cursive, with "Gerald" on the top line and "Bauldock" on the bottom line.

## Detailed Description

[0020] The present invention is designed to teach the relationship between a cylinder's surface areas and volume, its diameter and radius, the top circle circumference and area, the arc length, the sector area, the volume of a slice, the front area of the slice and the side area of the slice.

[0021] Referring to Figures 1a, 1b and 1c, the device includes a transparent hollow outer half-cylinder designated by reference number 1, and a solid inner half-cylinder designated by reference number 2. The inner half-cylinder can rotate around a common center designated by reference number 3 for both the inner and outer half-cylinders. The outer half-cylinder has marked off units around the 180 degrees of the half-cylinder. The equations for the circle's circumference and area, the arc length and sector area are shown on the top half circle. The arc length and sector area are color coded to clearly identify what they are referring to. The radius ( $r$ ) of the circle is identified. The inner half-cylinder also has marked off units around the 180 degrees of the half-cylinder. The equations for the volume of the cylinder and of a slice, the front surface area of the slice, and the side surface area of the slice are shown. The radius ( $r$ ) and the height of the cylinder ( $L$ ) are identified.

[0022] Referring to Figures 3a and 3b, the device includes a separate individual slice of the cylinder showing the equations for the volume of a slice, the front surface area of the slice, and the side surface area of the slice. The angle ( $\theta$ ) of the slice, the radius ( $r$ ) and the height of the slice ( $L$ ) are identified.

[0023] Referring to Figures 5a, 5b, 5c and 5d, the device includes separate individual slices at different angles and numerical values for the radius and height of the slice. The actual values of the arc length, the sector area, the volume of a slice, the front surface area of the slice, and the side surface area of the slice are given. Referring to Figures 6a, 6b, 6c and 6d, the individual slices can be attached to the inner half-cylinder to make a complete 360-degree cylinder. The four slices have angles of 30 degrees designated by reference number 4, 15 degrees designated by reference number 5, 45 degrees designated by reference number 6, and 90 degrees designated by reference number 7. The number of slices and their angles are not limited to the number of slices and angles mentioned here.

[0024] Classroom activities can be developed using the present invention that will increase the level of understanding of the cylinder's geometry and the equations involved. One such activity involves revolving the inner cylinder to different angles. A

slice of the cylinder is exposed allowing the arc length, the sector area, the volume of the slice, and the front and side surface areas of the slice to be calculated. Students can practice calculating the values of the arc length, the sector area, the volume of the slice, and the front and side surface areas by varying the amount of the slice that is exposed.

[0025] Another classroom activity involves reversing the activity above. The arc length, the sector area, the volume of the slice, the front surface area or the side surface areas is given and then the students must revolve the inner half-cylinder to the position that will make the slice with the correct values.

[0026] The individual slices can be used as models and help the students to internalize the meaning of the cylinder's surface areas and volume, its diameter and radius, the top circle circumference and area, the arc length, the sector area, the volume of a slice, the front area of the slice, the side area of the slice and the equations that go along with them.

[0027] Participating in these activities brings the level of learning and understanding of a cylinder and its geometry and equations to a conceptual level rather than just a fact remembering level as described in the Blooms Taxonomy.



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Amendment Figures

- 1) The figures have been modified to include reference numbers.
- 2) The figures have been modified to give acceptable margins.
- 3) The figures have been modified to properly label each view.
- 4) The figures have been modified to remove improper shading.

The amendments includes no new matter that was not disclosed in the original specifications.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Gerald Bauldock

*Gerald Bauldock*